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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/756,319	01/14/2004	Tomaru Ogawa	040302-0376	2422

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FOLEY AND LARDNER LLP
SUITE 500
3000 K STREET NW
WASHINGTON, DC 20007

EXAMINER	
ROE, JESSEE RANDALL	

ART UNIT	PAPER NUMBER
1742	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/756,319	OGAWA ET AL.	
	Examiner	Art Unit	
	Jessee Roe	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 April 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *16-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *16-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Status

Claims 10-30 are pending wherein claims 16-18 are amended; claims 19-30 are new; claims 1-9 are canceled and claims 10-15 are withdrawn from consideration.

Status of Previous Rejections

The previous rejection of claims 16-18 under 35 U.S.C. 102(b) as being anticipated by Ogino (US 6,294,276) is withdrawn in view of the Applicant's amendments to the claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 16-24 and 26-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami et al. (US 4,749,514) with evidence from Norley et al. (US 6,613,252) in view of Nazri (US 6,294,142).

In regards to claims 16-19 and 21-23, Murakami et al. ('514) disclose a hydrogen storage material comprising a plurality of graphite layers wherein the particles would be comprised of atoms and molecules including Li, K, Rb, Cs, Ba, Ca, Mn, Fe, Ni, Co, Cu, Mo, K-NH_3 Li-NH_3, Rb-NH_3, Cs-NH_3, Ba-NH_3, Ca-NH_3, K-H, K-D, Li-THF, Na-THF, K-

THF, K-C_6H_6, K-DMSO would be inserted between the layers (col. 2, lines 41-69). Layers of graphite are otherwise referred to as graphenes, as evidenced by Norley et al. ('252) (col. 2, lines 28-44). Murakami et al. ('514) further disclose wherein potassium intercalated graphite networks would be used for hydrogen storage (col. 1, line 45 – col. 2, line 5). The insertion of particles such as Li, K, Rb, Cs, Ba, Ca, Mn, Fe, Ni, Co, Cu, Mo, K-NH_3 Li-NH_3, Rb-NH_3, Cs-NH_3, Ba-NH_3, Ca-NH_3, K-H, K-D, Li-THF, Na-THF, K-THF, K-C_6H_6, K-DMSO between graphite (graphene) layers would inherently define an interlayer distance. Murakami et al. ('514) disclose a hydrogen storage material as shown above, but Murakami et al. ('514) do not specify wherein the hydrogen storage material would be placed in a hydrogen storage system of a fuel cell vehicle.

Nazri ('142) discloses wherein intercalated graphite material would be used in the hydrogen storage system of engines, fuel cells and the like. Graphite is capable of reversibly absorbing unusually large amounts of hydrogen (col. 1, lines 10-47 and col. 2, lines 37-64).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the graphite storage material, as disclosed by Murakami et al. ('514) with evidence from Norley et al. ('252), in the hydrogen storage system of a fuel cell vehicle, as disclosed by Nazri ('142), in order to reversibly absorb large amounts of hydrogen, as disclosed by Nazri ('142) (col. 1, lines 10-47 and col. 2, lines 37-64).

Still regarding claim 16, Nazri ('142) further discloses wherein metal containers

(tanks) would be suitable for confining gas at high pressures (col. 1, lines 10-28). Therefore, the metal container would also house the storage material.

In regards to claims 20, 24 and 26-30, Murakami et al. ('514) with evidence from Norley et al. ('252) disclose a hydrogen storage material, as shown above, however, Murakami et al. ('514) with evidence from Norley et al. ('252) do not specify the interlayer distance. Murakami et al. ('514) with evidence from Norley et al. ('252) disclose that the method for producing the hydrogen storage material is comprised of a vacuum or inert gas chamber under substantially similar temperature conditions(col. 2, lines 40-68 and col. 3, lines 28-42). Because the materials used to make the hydrogen storage material and the method disclosed by Murakami et al. ('514) with evidence from Norley et al. ('252) are substantially similar, it would be expected that the distance between the planar molecular layers with hydrogen present (inside the hydrogen storage tank) and without hydrogen present (outside of the hydrogen storage tank) would also be the same as that of the instant invention absent technical evidence to the contrary. See MPEP 2112.01 I.

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami et al. (US 4,749,514) with evidence from Norley et al. (US 6,613,252) in view of Nazri (US 6,294,142), and further in view of Heung (US 6,267,229).

In regards to claim 25, Murakami et al. ('514) with evidence from Norley et al. ('252) in view of Nazri ('142) disclose a hydrogen storage material that would be used in a hydrogen storage tank of a fuel cell vehicle as shown above, but Murakami et al. ('514) with evidence from Norley et al. ('252) in view of Nazri ('142) do not specify

wherein the hydrogen storage tank would comprise a filter which prevents leakage of the hydrogen storage material from the hydrogen storage tank.

Heung ('229), in the same field of endeavor, discloses applying a filter to the port of a hydrogen storage device to prevent particles from escaping (abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a filter, as disclosed by Heung ('229) to the hydrogen storage tank, as disclosed by Murakami et al. ('514) with evidence from Norley et al. ('252) in view of Nazri ('142), in order to prevent particles from escaping, as disclosed by Heung ('229) (abstract).

Response to Arguments

Applicant's arguments with respect to claims 16-18 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP §706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will

expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessee Roe whose telephone number is (571) 272-5938. The examiner can normally be reached on Monday-Friday 7:30 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JR

ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700